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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,879	07/17/2003	Mona M. Eissa	TI-28394.1	3091

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EXAMINER	
CHEN, KIN-CHAN	

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 08/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,879	EISSA, MONA M.	
	Examiner	Art Unit	
	Kin-Chan Chen	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22,24-26 and 28-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22,24-26 and 28-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 22,24-26, and 28-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Newly added amendment in claims "consisting essentially of" is new matter. Specification does not clearly set forth an explicit definition as to excluding other process steps in the method "consisting essentially of " the claimed process steps.

Any claim containing an **exclusionary provision** which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. Ex parte Parks, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993). The mere absence of a positive recitation is not basis for an exclusion. Specification must clearly set forth an explicit definition. Johnson Worldwide Assocs., Inc. v. Zebco Corp., 175 F.3d985, 989 (Fed.Cir. 1999).

"A consisting essentially of' claim occupies a middle ground between closed claims that are written in a consisting of' format and fully open claims that are drafted in a comprising' format." PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). When an applicant contends that additional steps or materials in the prior art are excluded by the recitation of "consisting essentially of," **applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention.**

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

For search and examination purposes, absent a clear indication in the specification of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48 USPQ at 1355.

3. Claims 22,24-26, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. 6,162,671) as evidenced by Kwag et al. (US 6,232,228) and Kogure et al. (US 5,250,471).

Lee teaches etching TaN or TiN during the semiconductor device processing, using combining hydrofluoric acid and hydrogen peroxide in deionized water, applying solution in the presence of photoresist (col. 5, lines 39-42, 54; col. 6, lines 27-28; also col.10, lines 45-50). Lee teaches that the hydrofluoric acid has a concentration in the range of 50% (col. 6, line 32), which is very close to 49% of the instant claim. Since the prior art range is close enough that it would be obvious that one skilled in the art would have expected it to have the same properties. Lee teaches that hydrogen peroxide may

have a concentration of 1% to 36%, which encompasses the claimed range (see col. 6, lines 30-31).

Lee teaches etching solution is used at a temperature of 20 ^{0}C to 70 ^{0}C (so-called room temperature), see col. 6, lines 36-37.

Lee teaches etching solution is used at a temperature of 20 ^{0}C to 70 ^{0}C, which encompasses the claimed range, see col. 6, lines 36-37.

Claims 22, 24-26, and 28-31 differ from Lee by specifying various compositions (such as a volume ratio greater than 1:1:20 of HF:H_2O_2 : deionized water in claims 22 and 26; a volume ratio greater than 2:1:21 of HF:H_2O_2 : deionized water in claims 24 and 28) However, same were known to be result effective variables and commonly determined by routine experiment. The process of conducting routine experimentations (optimizations) so as to produce an expected result is obvious to one of ordinary skill in the art. In the absence of showing criticality or new, unexpected results, which is different in kind and not merely in degree from the results of the prior art, it is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify Lee by performing routine experiments by using various compositions to obtain optimal result, MPEP 2144.05 II. See Kwag et al. (US 6,232,228; col. 16, lines 65-67) as evidence. Kwag discloses the etching properties can be easily changed by varying the supply amount of the etching composition. See also Kogure et al. (US 5,250,471; col. 2, lines 54-59) as evidence. Kogure discloses that the mixing ratio of the etching liquid, the temperature of etching

liquid and the etching time have the close relation with the etching speed and etching amount.

The amounts of an ingredient would have been well within the ordinary skill in the art, absent a showing of criticality. See *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

" The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation where in a disclosed set of percentage ranges is the optimum combination of percentages" *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed.Cir. 2003).

4. Claims 22,24-26, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwag et al.(US 6,232,228) as evidenced by Lee (U.S. 6,162,671) and Kogure et al. (US 5,250,471).

Kwag teaches a method for etching copper and dielectric materials (such as silicon nitride, TEOS) using an etching solution of a mixture of one oxidant (e.g., hydrogen peroxide), one enhancer (e.g., HF) and a buffer solution (e.g., deionized water). The etching solution may be applied in the presence of photoresist. The temperature in a range form 20 to 90 °C may be used, which encompasses the claimed temperature or range. See col. 4, lines 2-25 and col. 5, lines 27-43; col. 8, lines 15-18; col. 11, line 40.

Kwag is not particular about the concentrations of HF and hydrogen peroxide being used in the process. Hence, it would have been obvious to one with ordinary skilled in the art to use commonly available concentrations of HF and hydrogen

peroxide as instantly claimed, see Lee (U.S. 6,162,671), in the aforementioned paragraph as evidence.

The instant claims differ from Kwag by specifying various volume ratios of hydrofluoric acid : hydrogen peroxide : water (such as a volume ratio greater than 1:1:20 of $HF:H_2O_2$: deionized water in claims 22 and 26; a volume ratio greater than 2:1:21 of $HF:H_2O_2$: deionized water in claims 24 and 28). However, Kwag teaches that the etch properties can be easily changed by adjusting the etching composition. The etchant composition is known to be a result-effective variable. In the absence of showing criticality or new, unexpected results, which is different in kind and not merely in degree from the results of the prior art, it is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify Kwag by using various compositions and determine the suitable volume ratio through routine experimentation in order to obtain the best etched product achievable. MPEP 2144.05 II. Also see Kogure et al. (US 5,250,471; col. 2, lines 54-59) as evidence. Kogure teaches that the mixing ratio of the etchant have close relation with etching rate and etching amount.

Response to Arguments

5. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Applicant has argued that there are infinite number of possibilities for the volume ratios and the claimed limitation, therefore, it is not obtainable using routine experimentation. It is not persuasive. As has been stated in the office action, the etchant composition is known to be a result-effective variable. In the absence of showing criticality or new, unexpected results, which is different in kind and not merely in degree from the results of the prior art, it is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify Lee by performing routine experiments by using various compositions to obtain optimal result, MPEP 2144.05 II. See Kwag et al. (US 6,232,228; col. 16, lines 65-67) as evidence. Kwag discloses the etching properties can be easily changed by varying the supply amount of the etching composition. See also Kogure et al. (US 5,250,471; col. 2, lines 54-59) as evidence. Kogure discloses that the mixing ratio of the etching liquid, the temperature of etching liquid and the etching time have the close relation with the etching speed and etching amount. See also case law cited above.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kogure et al. (US 5,250,471; col. 2, lines 54-59) disclose that the mixing ratio of the etching liquid, the temperature of etching liquid and the etching time have the close relation with the etching speed and etching amount.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (571) 272-1461. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 25, 2005

Kin-Chan Chen
Primary Examiner
Art Unit 1765

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